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Spray Containing Ubiquinone Q_n

Ubiquinones are prenylated quinones which are wide-spread in the animal and vegetable kingdoms. They are derivatives of 2,3-dimethoxy-5-methyl-1,4-benzoquinone having linearly linked isoprene units in the 6-position. Depending on the number of isoprene units, the ubiquinones are designated as Q-1, Q-2, Q-3 etc. In most mammals including humans, Q-10 (2,3-dimethoxy-5-methyl-6-deca-prenyl-1,4-benzoquinone) is prevailing. Ubiquinones serve as electron carriers in the respiratory chain, and they participate in the cyclic oxidation and reduction of substrates in the citric acid cycle. Ubiquinones Q_n represent a precondition of the energy supply to all cells. The oxidative stress which arises, inter alia, from a high oxygen consumption causes damage to the membranes of mitochondria and cells which result in acute or degenerative disorders of the nervous system. The nervous system has a very high energy demand for the signal transduction by membrane potential build-up, ion-channel control, as well as by neuropeptide and neurotransmitter vesicle formation.

Ubiquinone Q-10 (also referred to as coenzyme Q-10) has previously been used in the therapy of heart diseases.

The subject matter of the invention is a spray containing ubiquinone Q_n or ubiquinone Q_n precursors together with usual auxiliaries.

The term "ubiquinone Q_n precursors" refers to compounds which are converted to ubiquinone Q_n in the body. These include, on the one hand, the ubihydroquinones, which are in an equilibrium with the ubiquinones, as well as simple esters of the ubihydroquinones with short-chained carboxylic acids having from 1 to 10 carbon

atoms, for example, acetate, propionate or butyrate esters. These precursors are converted to the corresponding ubiquinones after the application thereof.

Ubiquinone Q-10 is preferably used because this is the main ubiquinone in humans.

The spray according to the invention is preferably an oral or nasal spray, so that the administration of ubiquinone Q_n or ubiquinone Q_n precursors can be effected on an inhalative or intranasal route. The spray according to the invention is useful, in particular, for the treatment of pain conditions as encountered in migraine and neuropathy, in neural disorders, such as depressions, psychoses, lack of concentration, and in neurodegenerative diseases, such as Alzheimer's, Parkinson's, Huntington's, multiple sclerosis and cerebral paresis. The application as an oral or nasal spray seems to accelerate the transport of ubiquinone Q_n or its precursors through the blood-brain barrier. It was found that the oral administration of from 600 to 800 mg of Q-10 in the form of capsules exhibited virtually no effect on migraine, whereas a nasal formulation could effectively alleviate pain from migraine and tension headaches already at a low amount. Thus, doses of about 20 mg were sufficient for a significant alleviation of pain. In principle, however, doses of as high as 1000 mg can be employed.

Ubiquinones are lipophilic substances which are virtually insoluble in water. However, a particularly high effectiveness was found when the ubiquinone Q_n or its precursors are in aqueous dispersion. Aqueous colloidal dispersions are particularly preferred. The preparation of the corresponding dispersions is described in WO 95/05164 and in the related DE-A-43 27 063.